HYDRAULIC DISTRIBUTOR COMPRISING AN INPUT ELEMENT WITH A SCAVENGING VALVE

The subject of the present invention is a hydraulic distributor comprising an input element with a scavenging valve.

This input element has a body provided with orifices for respective connection P to the pump, T to the reservoir and LS for a return of information to the pump, the body having a bore which can place into communication the orifices P and T respectively connected to the pump and to the reservoir, inside which bore is mounted a piston which is able to establish or not to establish this communication, one end of the piston being subjected to the pressure of the pump and the other end thereof being subjected to the pressure LS for the return of information and to the pressure of a spring. Arranged on the line LS for the return of information to the pump are a pressure limiter and a flow regulator. The pressure limiter is aimed at protecting the unit and the pump. The flow regulator is aimed at decompressing the line LS so that the pump can assume its rest position. This regulator discharges oil as a function of the calibration.

The scavenging valve is intended to circulate oil from the pump to the reservoir when the distributor is in the rest position. The force exerted by the spring is significantly greater than the pump regulation value. Although the pump pressure regulation value is around 15 bar, the pressure exerted by the spring on the piston is around 25 bar.

This results in sudden jolts during the start of a hydraulic movement, since it is the pressure of 25 bar that is taken into account instead of the theoretical

pressure of 15 bar.

The object of the invention is to allow the scavenging valve to operate with a low spring force, allowing sudden jolts to be avoided when controlling a hydraulic movement.

To this end, according to the invention the pressure exerted by the spring is substantially equal to the delivery pressure of the pump, and the piston and/or the body have or has orifices for placing in communication the chambers situated on the pump P side and reservoir T side when the distributor is in the neutral position.

By virtue of the orifices, the scavenging valve allows a portion of delivery oil from the pump to circulate when the distribution unit is not stressed.

Advantageously, the cross section of the orifices allows the passage of a flow of between 10 and 15% of the maximum installed flow, under a pressure of around 15 bar.

This arrangement makes it possible on the one hand to ensure a minimum flow in the neutral position of the distributor, under the delivery pressure of the pump, and to maintain a minimum flow in the exhaust line to ensure an optimum replenishing function.

This circulation also makes it possible to maintain a fluid flow to bring about cooling of the fluid.

This arrangement makes it possible to check, control and adjust the delivery pressure value of the pump in the neutral position of the distributor.

As indicated above, the dynamic behavior of the machine

is improved by virtue of progressive control, since the opening cross section of the slide valves is not subjected to large pressure variations.

The overpressure function is still performed during sudden stoppages, and the valve is closed progressively as soon as the operating pressure becomes lower than the nominal pressure.

According to a first embodiment, the orifices for placing in communication the chambers situated on the pump P side and reservoir T side consist of cutouts or slots opening into the outer surface of the piston or into the surface of the body delimiting the bore for the piston.

According to another embodiment, the orifices for placing in communication the chambers situated on the pump P side and reservoir T side consist of at least one duct formed in the piston or in the body.

Advantageously, the cross section of the orifices situated on the pump P side and reservoir T side varies as a function of the characteristics of the distribution slide valve.

In any event, the invention will be better understood with the aid of the description which follows with reference to the appended schematic drawing which represents, by way of non-limiting example, an embodiment of this input element with a scavenging valve.

Figure 1 is a view thereof in longitudinal section.

Figure 2 is a view of a curve illustrating the variation in the opening cross section of the distributor feeder as a function of the pressure

supplied by the pump.

Figure 3 is a view of a curve illustrating the variation of fluid flow in the scavenging valve as a function of the pressure supplied by the pump.

Figure 1 represents the input element, the body of which is denoted by the reference 2. This body is provided with orifices for respective connection P to the pump, T to the reservoir and LS for a return of information to the pump. The body comprises a bore 3 capable of placing in communication the chambers 4 and 5 respectively connected to the orifices P and T, which are connected to the pump and to the reservoir. Mounted slidably in this bore 3 is a piston 6 having one end subjected to the pressure P of the pump and the other end subjected to the pressure LS for the return of information and to the pressure of a spring 7.

According to the essential characteristic of the invention, orifices 8 are formed in the piston 6 so as to allow the passage of a leakage flow when the piston is in the closed position between the chambers 4 and 5. In the embodiment represented in the drawing, the orifices 8 consist of cutouts formed in the body of the piston and opening into the external face of the latter.

The spring 7 is dimensioned so as to exert a pressure which is substantially equal to the delivery pressure of the pump.

Figure 2 represents a graph in which the abscissa axis illustrates the opening cross section of the feeder for supplying fluid to a user via the distributor, and the ordinate axis illustrates the fluid pressure supplied by the pump. The curve SD shows a linear change in the opening cross section of the feeder as a function of

the pressure, while the curves SD1 and SD2 are envelope curves showing the change in cross section as a function of the shape of the openings or cutouts delimiting the passage of fluid at the feeder. This graph also represents a curve QB showing the change in flow consumed by the scavenging valve as a function of the fluid pressure supplied by the pump. This curve shows that the flow QB consumed by the scavenging valve decreases when the opening cross section of the feeder increases. The flow QB consumed decreases at the same time as the pressure supplied by the pump. This pressure drop is due to losses in the pump/distributor circuit during opening of the distributor.

Figure 3 supplements figure 2, illustrating the variation of the flow QB consumed in the scavenging valve as a function of the pump pressure. It is possible to vary the flow consumed by the scavenging valve by adapting the cross section of the leakage orifices formed between the chamber 4 subjected to the hydraulic pressure and the chamber 5 connected to the reservoir.

As goes without saying, the invention is not restricted solely to the embodiment of this input element with a scanning valve, described above by way of example; on the contrary, it covers all the variants thereof. Thus, in particular, the orifices 8 formed in the piston could be replaced by orifices formed in the wall of the bore serving for the displacement of the piston, or else by ducts formed in the piston and/or ducts formed in the body of the element, without thereby departing from the scope of the invention.